Date: 19 February 2001
To: Bechtel Hanford, Inc. (technical representative)
From: TechLaw, Inc.
Project: 105-F Rx Phase IV Upper Fill and Soil Sampling
Subject: Radiochemistry - Data Package No. H1193-ES (SDG No. H1193)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H1193-ES which was prepared by Eberline Services (ES). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B11470	12/19/00	Soil	C	See note 1
B11471	12/19/00	Soil	C	See note 1
B11472	12/19/00	Soil	C	See note 1
B11473	12/19/00	Soil	C	See note 1
B11474	12/19/00	Soil	C	See note 1
B11475	12/19/00	Soil	C	See note 1
B11476	12/19/00	Soil	C	See note 1

1 - Gamma spectroscopy; total strontium; alpha spectroscopy; nickel-63; carbon-14; and tritium.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and "Sample and Analysis Plan for 105F and 105DR Phase III Below Grade Structures and Underlying Soils" (DOE/RL-99-35). Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Data Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times**

  Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months and 7 days for liquid scintillation counting.

  All holding times were acceptable.

- **Preparation (Method) Blanks**

  Laboratory Blanks

  Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the minimum detectable activity (MDA), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

  All blank results were acceptable.

  Field Blank

  No field blanks were submitted with the SDG, therefore, no field blank data was present for review.

- **Accuracy**

  Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample and matrix spike recovery is 70-130% (80-120% for gamma spectroscopy). In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

Due to the lack of a matrix spike analysis, all carbon-14 results were qualified as estimates and flagged "J".

All accuracy results were acceptable.

- **Laboratory Duplicates**

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the contract required detection limit (CRDL) and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

Field Duplicate

One set of field duplicates (B11475/B11476) was submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels are compared against the 105DR PQLs to ensure that laboratory detection levels meet the required criteria. The PQL was exceeded for the following: Europium-155 in all samples except B11473 and B11476 and europium-154 in sample B11472. Under the BHI statement of work, no qualification is required. All other reported laboratory MDAs were at or below the PQL.

- **Completeness**

Data package No. H1193-ES (SDG No. H1193) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the lack of a matrix spike analysis, all carbon-14 results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The PQL was exceeded for the following: Europium-155 in all samples except B11473 and B11476 and europium-154 in sample B11472. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-35, *Sample and Analysis Plan for 105F and 105DR Phase III Below Grade Structures and Underlying Soils.*

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.

UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1193	REVIEWER: TLI	DATE: 2/19/01	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Carbon-14	J	All	No matrix spike analysis

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G)

Project: BECHTEL-HANFORD																					
Laboratory: ES																					
Case	SDG: H1193																				
Sample Number		B11470		B11471		B11472		B11473		B11474		B11475		B11476							
Remarks														Duplicate							
Sample Date		12/19/00		12/19/00		12/19/00		12/19/00		12/19/00		12/19/00		12/19/00							
Radiochemistry	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q		
Tritium		0.425		0.545		0.606		0.851		0.401		0.726		0.803							
Carbon-14	50	-0.517	UJ	3.34	UJ	3.95	UJ	2.30	UJ	2.20	UJ	1.85	UJ	2.38	UJ						
Nickel-63	30	6.23		1.50		2.34		10.6		4.10		2.50		3.86							
Strontium (total)	1	0.073	U	0.098	U	0.048	U	0.017	U	0.048	U	0.086	U	-0.012	U						
Uranium-233	1	0.382		0.251		0.363		0.187		0.423		0.240		0.296							
Uranium-235	1	0.026	U	0.030	U	0.059	U	0.085	U	0.032	U	0	U	0.030	U						
Uranium-238	1	0.552		0.251		0.363		0.257		0.449		0.576		0.568							
Plutonium-238	1	0	U	-0.019	U	-0.035	U	0	U	0.018	U	0.017	U	0	U						
Plutonium-239/40	1	0.071	U	0	U	-0.018	U	0.018	U	0.036	U	0.119	U	0.037	U						
Americium-241	1	0	U	-0.026	U	0	U	0.118	U	0.099	U	0.072	U	0	U						
Potassium-40		13.1		13.6		13.2		12.4		12.7		13.4		13.3							
Cobalt 60	0.1	0.223		0.042		0.064		U	U	0.078		0.063		0.057							
Cesium 137	0.1	2.37		0.584		1.10		0.454		0.616		1.28		1.12							
Radium-226		0.493		0.490		0.537		0.464		0.505		0.454		0.458							
Radium-228		0.691		0.608		0.711		0.630		0.658		0.741		0.777							
Europium 152	0.2	2.21		0.455	U	0.709		0.334		0.584		0.979		0.835							
Europium 154	0.2	0.243		U	U	U	U	U	U	U	U	U	U	U	U						
Europium 155	0.1	U	U	U	U	U	U	U	U	U	U	U	U	U	U						
Thorium-228		0.563		0.539		0.607		0.578		0.600		0.586		0.595							
Thorium-232		0.691		0.608		0.711		0.630		0.658		0.741		0.777							
Uranium-235 (GEA)		U	U	U	U	U	U	U	U	U	U	U	U	U	U						
Uranium-238 (GEA)		U	U	U	U	U	U	U	U	U	U	U	U	U	U						
Americium-241 (GEA)		U	U	U	U	U	U	U	U	U	U	U	U	U	U						

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Laboratory applied non-detect qualifiers "U" have been included in this table to minimize potential miss-interpretation of results. All other qualifiers shown were applied during validation.

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SAMPLE DELIVERY GROUP H1193

R012132-01 B11470

DATA SHEET

SDG	7597	Client/Case no	Hanford SDG H1193
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925
Lab sample id	R012132-01	Client sample id	B11470
Dept sample id	7597-001	Location/Matrix	105F Area SOLID
Received	12/21/00	Collected	12/19/00 08:30
% solids	94.7	Custody/SAF No	R01030-03 B01-030

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.425	0.069	0.092	400	J	H
Carbon 14	14762-75-5	-0.517	3.0	5.0	50	U J	C
Nickel 63	13981-37-8	6.23	0.72	1.0	30	J	NI_L
Total Strontium	SR-RAD	0.073	0.13	0.25	1.0	U	SR
Uranium 233	U-233/234	0.382	0.17	0.16	1.0	J	U
Uranium 235	15117-96-1	0.026	0.051	0.20	1.0	U	U
Uranium 238	U-238	0.552	0.22	0.16	1.0	J	U
Plutonium 238	13981-16-3	0	0.035	0.14	1.0	U	PU
Plutonium 239/240	PU-239/240	0.071	0.071	0.14	1.0	U	PU
Americium 241	14596-10-2	0	0.087	0.17	1.0	U	AM
Potassium 40	13966-00-2	13.1	0.64	0.29			GAM
Cobalt 60	10198-40-0	0.223	0.039	0.035	0.050		GAM
Cesium 137	10045-97-3	2.37	0.076	0.048	0.10		GAM
Radium 226	13982-63-3	0.493	0.073	0.076	0.10		GAM
Radium 228	15262-20-1	0.691	0.15	0.15	0.20		GAM
Europium 152	14683-23-9	2.21	0.10	0.091	0.10		GAM
Europium 154	15585-10-1	0.243	0.090	0.099	0.10		GAM
Europium 155	14391-16-3	U		0.12	0.10	U	GAM
Thorium 228	14274-82-9	0.563	0.042	0.050			GAM
Thorium 232	TH-232	0.691	0.15	0.15			GAM
Uranium 235	15117-96-1	U		0.16		U	GAM
Uranium 238	U-238	U		4.6		U	GAM
Americium 241	14596-10-2	U		0.15		U	GAM

105-F Rx Phase IV Upper Fill & Soil

K 2/17/01

Lab id	TMANC
Protocol	Hanford
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DATA SHEETS
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SAMPLE DELIVERY GROUP H1193

R012132-02 B11471

DATA SHEET

SDG	7597	Client/Case no	Hanford SDG H1193
Contact	Melisse C. Mannion	Contract	TRC-SBB-207925
Lab sample id	R012132-02	Client sample id	B11471
Dept sample id	7597-002	Location/Matrix	105F Area SOLID
Received	12/21/00	Collected	12/19/00 08:35
% solids	91.4	Custody/SAF No	B01030-03 B01-030

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.545	0.075	0.096	400	J	H
Carbon 14	14762-75-5	3.34	3.1	5.2	50	U J	C
Nickel 63	13981-37-8	1.50	0.65	1.0	30	J	NI_L
Total Strontium	SR-RAD	0.098	0.13	0.24	1.0	U	SR
Uranium 233	U-233/234	0.251	0.15	0.19	1.0	J	U
Uranium 235	15117-96-1	0.030	0.061	0.23	1.0	U	U
Uranium 238	U-238	0.251	0.15	0.19	1.0	J	U
Plutonium 238	13981-16-3	-0.019	0.038	0.14	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.038	0.14	1.0	U	PU
Americium 241	14596-10-2	-0.026	0.10	0.25	1.0	U	AM
Potassium 40	13966-00-2	13.6	0.80	0.40			GAM
Cobalt 60	10198-40-0	0.042	0.030	0.035	0.050	J	GAM
Cesium 137	10045-97-3	0.584	0.049	0.038	0.10		GAM
Radium 226	13982-63-3	0.490	0.082	0.082	0.10		GAM
Radium 228	15262-20-1	0.608	0.15	0.17	0.20		GAM
Europium 152	14683-23-9	0.455	0.068	0.081	0.10		GAM
Europium 154	15585-10-1	U		0.14	0.10	U	GAM
Europium 155	14391-16-3	U		0.13	0.10	U	GAM
Thorium 228	14274-82-9	0.539	0.042	0.045			GAM
Thorium 232	TH-232	0.608	0.15	0.17			GAM
Uranium 235	15117-96-1	U		0.15		U	GAM
Uranium 238	U-238	U		5.1		U	GAM
Americium 241	14596-10-2	U		0.32		U	GAM

105-F Rx Phase IV Upper Fill & Soil

2/17/01

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-ps
Version	3.06
Report date	01/11/01

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SAMPLE DELIVERY GROUP H1193

R012132-03 B11472

DATA SHEET

SDG 7597	Client/Case no Hanford	SDG H1193	
Contact Melissa C. Mannion	Contract TRC-SBB-207925		
Lab sample id R012132-03	Client sample id B11472		
Dept sample id 7597-003	Location/Matrix 105F Area	SOLID	
Received 12/21/00	Collected 12/19/00 08:40		
% solids 92.3	Custody/SAF No B01030-03	B01-030	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.606	0.077	0.096	400	J	H
Carbon 14	14762-75-5	3.95	3.2	5.2	50	U J	C
Nickel 63	13981-37-8	2.34	1.1	2.0	30	J	NI_L
Total Strontium	SR-RAD	0.048	0.12	0.24	1.0	U	SR
Uranium 233	U-233/234	0.363	0.19	0.18	1.0	J	U
Uranium 235	15117-96-1	0.059	0.059	0.22	1.0	U	U
Uranium 238	U-238	0.363	0.19	0.18	1.0	J	U
Plutonium 238	13981-16-3	-0.035	0.035	0.17	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.018	0.035	0.13	1.0	U	PU
Americium 241	14596-10-2	0	0.086	0.17	1.0	U	AM
Potassium 40	13966-00-2	13.2	1.0	0.60			GAM
Cobalt 60	10198-40-0	0.064	0.050	0.059	0.050		GAM
Cesium 137	10045-97-3	1.10	0.086	0.066	0.10		GAM
Radium 226	13982-63-3	0.537	0.11	0.11	0.10		GAM
Radium 228	15262-20-1	0.711	0.22	0.23	0.20		GAM
Europium 152	14683-23-9	0.709	0.10	0.12	0.10		GAM
Europium 154	15585-10-1	U		0.21	0.10	U	GAM
Europium 155	14391-16-3	U		0.14	0.10	U	GAM
Thorium 228	14274-82-9	0.607	0.056	0.064			GAM
Thorium 232	TH-232	0.711	0.22	0.23			GAM
Uranium 235	15117-96-1	U		0.18		U	GAM
Uranium 238	U-238	U		7.3		U	GAM
Americium 241	14596-10-2	U		0.18		U	GAM

105-F Rx Phase IV Upper Fill & Soil

2/17/01

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/11/01

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SAMPLE DELIVERY GROUP H1193

R012132-04 B11473

DATA SHEET

SDG	7597	Client/Case no	Hanford SDG H1193
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925
Lab sample id	R012132-04	Client sample id	B11473
Dept sample id	7597-004	Location/Matrix	105F Area SOLID
Received	12/21/00	Collected	12/19/00 08:45
% solids	93.6	Custody/SAF No	B01030-03 B01-030

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.851	0.082	0.094	400	J	H
Carbon 14	14762-75-5	2.30	2.9	4.8	50	U J	C
Nickel 63	13981-37-8	10.6	1.6	2.7	30	J	NI_L
Total Strontium	SR-RAD	0.017	0.12	0.21	1.0	U	SR
Uranium 233	U-233/234	0.187	0.14	0.18	1.0	J	U
Uranium 235	15117-96-1	0.085	0.11	0.22	1.0	U	U
Uranium 238	U-238	0.257	0.14	0.18	1.0	J	U
Plutonium 238	13981-16-3	0	0.036	0.14	1.0	U	PU
Plutonium 239/240	PU-239/240	0.018	0.036	0.14	1.0	U	PU
Americium 241	14596-10-2	0.118	0.12	0.15	1.0	U	AM
Potassium 40	13966-00-2	12.4	0.58	0.24			GAM
Cobalt 60	10198-40-0	U		0.031	0.050	U	GAM
Cesium 137	10045-97-3	0.454	0.039	0.034	0.10		GAM
Radium 226	13982-63-3	0.464	0.059	0.054	0.10		GAM
Radium 228	15262-20-1	0.630	0.10	0.10	0.20		GAM
Europium 152	14683-23-9	0.334	0.054	0.069	0.10		GAM
Europium 154	15585-10-1	U		0.095	0.10	U	GAM
Europium 155	14391-16-3	U		0.080	0.10	U	GAM
Thorium 228	14274-82-9	0.578	0.034	0.033			GAM
Thorium 232	TH-232	0.630	0.10	0.10			GAM
Uranium 235	15117-96-1	U		0.11		U	GAM
Uranium 238	U-238	U		3.3		U	GAM
Americium 241	14596-10-2	U		0.11		U	GAM

105-F Rx Phase IV Upper Fill & Soil

2/17/01

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 01/11/01

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SAMPLE DELIVERY GROUP H1193

R012132-05 B11474

DATA SHEET

SDG	7597	Client/Case no	Hanford SDG H1193
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925
Lab sample id	R012132-05	Client sample id	B11474
Dept sample id	7597-005	Location/Matrix	105F Area SOLID
Received	12/21/00	Collected	12/19/00 08:50
% solids	94.0	Custody/SAF No	B01030-03 B01-030

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.401	0.070	0.095	400	J	H
Carbon 14	14762-75-5	2.20	3.2	5.2	50	U J	C
Nickel 63	13981-37-8	4.10	1.2	2.2	30	J	NI_L
Total Strontium	SR-RAD	0.048	0.11	0.20	1.0	U	SR
Uranium 233	U-233/234	0.423	0.21	0.20	1.0	J	U
Uranium 235	15117-96-1	0.032	0.064	0.24	1.0	U	U
Uranium 238	U-238	0.449	0.21	0.20	1.0	J	U
Plutonium 238	13981-16-3	0.018	0.036	0.14	1.0	U	PU
Plutonium 239/240	PU-239/240	0.036	0.036	0.14	1.0	U	PU
Americium 241	14596-10-2	0.099	0.15	0.19	1.0	U	AM
Potassium 40	13966-00-2	12.7	0.86	0.44			GAM
Cobalt 60	10198-40-0	0.078	0.047	0.048	0.050		GAM
Cesium 137	10045-97-3	0.616	0.059	0.057	0.10		GAM
Radium 226	13982-63-3	0.505	0.082	0.085	0.10		GAM
Radium 228	15262-20-1	0.658	0.20	0.21	0.20		GAM
Europium 152	14683-23-9	0.584	0.092	0.11	0.10		GAM
Europium 154	15585-10-1	U		0.17	0.10	U	GAM
Europium 155	14391-16-3	U		0.11	0.10	U	GAM
Thorium 228	14274-82-9	0.600	0.046	0.051			GAM
Thorium 232	TH-232	0.658	0.20	0.21			GAM
Uranium 235	15117-96-1	U		0.16		U	GAM
Uranium 238	U-238	U		5.6		U	GAM
Americium 241	14596-10-2	U		0.15		U	GAM

105-F Rx Phase IV Upper Fill & Soil

2/17/01

Lab id	TMANC
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SAMPLE DELIVERY GROUP H1193

R012132-06 B11475

DATA SHEET

SDG 7597	Client/Case no Hanford	SDG H1193	
Contact Melissa C. Mannion	Contract TRC-SBB-207925		
Lab sample id R012132-06	Client sample id B11475		
Dept sample id 7597-006	Location/Matrix 105F Area	SOLID	
Received 12/21/00	Collected 12/19/00 08:55		
% solids 93.9	Custody/SAF No B01030-03	B01-030	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.726	0.077	0.091	400	J	H
Carbon 14	14762-75-5	1.85	3.2	5.2	50	U J	C
Nickel 63	13981-37-8	2.50	1.1	2.0	30	J	NI_L
Total Strontium	SR-RAD	0.086	0.12	0.18	1.0	U	SR
Uranium 233	U-233/234	0.240	0.14	0.18	1.0	J	U
Uranium 235	15117-96-1	0	0.058	0.22	1.0	U	U
Uranium 238	U-238	0.576	0.24	0.18	1.0	J	U
Plutonium 238	13981-16-3	0.017	0.034	0.13	1.0	U	PU
Plutonium 239/240	PU-239/240	0.119	0.10	0.13	1.0	U	PU
Americium 241	14596-10-2	0.072	0.096	0.18	1.0	U	AM
Potassium 40	13966-00-2	13.4	0.69	0.28			GAM
Cobalt 60	10198-40-0	0.063	0.033	0.038	0.050		GAM
Cesium 137	10045-97-3	1.28	0.061	0.047	0.10		GAM
Radium 226	13982-63-3	0.454	0.068	0.073	0.10		GAM
Radium 228	15262-20-1	0.741	0.16	0.17	0.20		GAM
Europium 152	14683-23-9	0.979	0.074	0.075	0.10		GAM
Europium 154	15585-10-1	U		0.13	0.10	U	GAM
Europium 155	14391-16-3	U		0.12	0.10	U	GAM
Thorium 228	14274-82-9	0.586	0.039	0.043			GAM
Thorium 232	TH-232	0.741	0.16	0.17			GAM
Uranium 235	15117-96-1	U		0.15		U	GAM
Uranium 238	U-238	U		4.5		U	GAM
Americium 241	14596-10-2	U		0.29		U	GAM

105-F Rx Phase IV Upper Fill & Soil

2/17/01

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 01/11/01

TMA / RICHMOND

SAMPLE DELIVERY GROUP H1193

R012132-07 B11476

DATA SHEET

SDG	7597	Client/Case no	Hanford SDG H1193
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925
Lab sample id	R012132-07	Client sample id	B11476
Dept sample id	7597-007	Location/Matrix	105F Area SOLID
Received	12/21/00	Collected	12/19/00 08:55
% solids	94.3	Custody/SAF No	B01030-03 R01-030

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.803	0.079	0.091	400	J	H
Carbon 14	14762-75-5	2.38	3.0	5.0	50	U J	C
Nickel 63	13981-37-8	3.86	1.1	2.1	30	J	NI_L
Total Strontium	SR-RAD	-0.012	0.13	0.28	1.0	U	SR
Uranium 233	U-233/234	0.296	0.20	0.19	1.0	J	U
Uranium 235	15117-96-1	0.030	0.060	0.23	1.0	U	U
Uranium 238	U-238	0.568	0.25	0.19	1.0	J	U
Plutonium 238	13981-16-3	0	0.037	0.14	1.0	U	PU
Plutonium 239/240	PU-239/240	0.037	0.037	0.14	1.0	U	PU
Americium 241	14596-10-2	0	0.10	0.20	1.0	U	AM
Potassium 40	13966-00-2	13.3	0.55	0.20			GAM
Cobalt 60	10198-40-0	0.057	0.027	0.029	0.050		GAM
Cesium 137	10045-97-3	1.12	0.049	0.036	0.10		GAM
Radium 226	13982-63-3	0.458	0.060	0.059	0.10		GAM
Radium 228	15262-20-1	0.777	0.15	0.14	0.20		GAM
Europium 152	14683-23-9	0.835	0.062	0.067	0.10		GAM
Europium 154	15585-10-1	U		0.10	0.10	U	GAM
Europium 155	14391-16-3	U		0.087	0.10	U	GAM
Thorium 228	14274-82-9	0.595	0.034	0.036			GAM
Thorium 232	TH-232	0.777	0.15	0.14			GAM
Uranium 235	15117-96-1	U		0.12		U	GAM
Uranium 238	U-238	U		3.8		U	GAM
Americium 241	14596-10-2	U		0.12		U	GAM

105-F Rx Phase IV Upper Fill & Soil

2/17/01

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/11/01

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Eberline Services
W.O. No. R0-12-132-7597

Bechtel Hanford Inc.
SDG H1193

Case Narrative **Page 1 of 1**

1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H1193 was composed of seven solid (soil) samples designated under SAF No. B01-030 with a Project Designation of: 105-F Rx Phase IV Upper Fill and Soil Sampling.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to BHI via e-Fax on January 11, 2001.

2.0 ANALYSIS NOTES

2.1 Tritium Analyses

No problems were encountered during the course of the analyses.

2.2 Carbon-14 Analyses

No problems were encountered during the course of the analyses.

2.3 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

2.4 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.5 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses.

2.6 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.7 Americium-241 Analyses

No problems were encountered during the course of the analyses.

2.8 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, *both* technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Melissa Mannion 1/15/01

Melissa C. Mannion **Date**
Program Manager

00000019

Bechtel Hanford Inc. — CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B01-030-03 Page 1 of 2

Collector: Doug Rowers	Company Contact: Jason Adler; Telephone No. 372-2178	Project Coordinator: TRENT, SJ	Price Code 8L; Data Turnaround 21 Days
Project Designation: 105-F Rx Phase IV Upper Fill and Soil Sampling	Sampling Location: 105F area H1193 (7597)	SAF No. B01-030	Air Quality ☐
Ice Chest No. ERC99-008 (10H)	Field Logbook No. EFL 1131-8; COA RJ05F4 28OC	Method of Shipment: Fed EX	
Shipped To: TMA/~~RECRA~~ 4X 1249.00	Offsite Property No. A-010177	Bill of Lading/Air Bill No. 423579953-1404	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	~~Cool 4C~~	Cool 4C	None
Type of Container	aG	aG	aG	aG
No. of Container(s)	~~1~~ 2	~~1~~ 2	~~1~~ 2	1
Volume	125mL	250mL	250mL	1000mL
SAMPLE ANALYSIS	Chordane 1im - 7196	See item (1) in Special Instructions.	PCBs - 8082	See item (2) in Special Instructions.

Sample No.	Matrix *	Sample Date	Sample Time					
✓B11470	SOIL	12-19-00	0830				X	Tie to B11B54
✓B11471	SOIL	12-19-00	0835				X	↓
✓B11472	SOIL	12-19-00	0840				X	↓
✓B11473	SOIL	12-19-00	0844				X	↓
✓B11474	SOIL	12-19-00	0850				X	↓

CHAIN OF POSSESSION (Sign/Print Names)

Relinquished By	Date/Time	Received By	Date/Time
Doug Bowers / Doug Bowers	12-19-00/1315	Stored in RES 3C 3726	BS 12.19.00
Removed from 3C 3728 (RJT)	12.20.00 0800	R T Thoren	12.20.00 0800
R T Thoren	12.20.00 / 0800	FEDEX	12-20-00
Fed Ex	12-21-00 10:45	[illegible] Corso	12-21-00 10:45

SPECIAL INSTRUCTIONS

~~(1) ICP Metals - 6010A (TAL) (Barium); ICP Metals - 6010A (Add-on) (Lead); Mercury - 7471 - 4010~~ RT 12.20.00
(2) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 -- Total Sr; Nickel-63; Carbon-14; Tritium - H3

Matrix *: S=Soil, SE=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Appendix 5

Data Validation Supporting Documentation

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 105F Rx PH IV			DATA PACKAGE: H1193		
VALIDATOR: TLI		LAB: LVI		DATE: 2/17/01	
CASE:			SDG: H1193		

ANALYSES PERFORMED

☐ Gross Alpha/Beta	☐ Strontium-90	☐ Technetium-99	☐ Alpha Spectroscopy	☒ Gamma Spectroscopy	
☐ Total Uranium	☐ Radium-22	☒ Tritium	☒ C14	XU163	

SAMPLES/MATRIX B11470 B11471 B11472 B11473
B11474 B11475

Sul

1. Completeness . . . . . ☐ N/A

Technical verification forms present? . . . . . Yes No N/A

Comments:_____

2. Initial Calibration . . . . . ☐ N/A

Instruments/detectors calibrated within one year of sample analysis? . . . . . Yes No N/A

Initial calibration acceptable? . . . . . Yes No N/A

Standards NIST traceable? . . . . . Yes No N/A

Standards Expired? . . . . . Yes No N/A

Comments:_____

3. Continuing Calibration . . . . . ☒ N/A

Calibration checked within one week of sample analysis? . . .	Yes	No	N/A
Calibration check acceptable?	Yes	No	N/A
Calibration check standards NIST traceable?	Yes	No	N/A
Calibration check standards expired?	Yes	No	N/A

Comments:

4. Blanks . . . . . ☐ N/A

Method blank analyzed?	(Yes)	No	N/A
Method blank results acceptable?	(Yes)	No	N/A
Analytes detected in method blank?	Yes	(No)	N/A
Field blank(s) analyzed?	Yes	(No)	N/A
Field blank results acceptable?	Yes	No	(N/A)
Analytes detected in field blank(s)?	Yes	No	(N/A)
Transcription/Calculation Errors?	Yes	No	(N/A)

Comments: NO FB

5. Matrix Spikes . . . . . ☐ N/A

Matrix spike analyzed?	(Yes)	No	N/A
Spike recoveries acceptable?	(Yes)	No	N/A
Spike source traceable?	Yes	No	(N/A)
Spike source expired?	Yes	No	(N/A)
Transcription/Calculation Errors?	Yes	No	(N/A)

Comments: NO C14 MS all

6. Laboratory Control Samples . . . . . ☐ N/A

LCS analyzed?	(Yes)	No	N/A
LCS recoveries acceptable?	(Yes)	No	N/A
LCS traceable?	Yes	No	(N/A)
Transcription/Calculation Errors?	Yes	No	(N/A)

Comments:_____

7. Chemical Recovery . . . . . ☐ N/A

Chemical carrier added?	Yes	No	N/A
Chemical recovery acceptable?	Yes	No	N/A
Chemical carrier traceable?	Yes	No	N/A
Chemical carrier expired?	Yes	No	N/A
Transcription/Calculation errors?	Yes	No	N/A

Comments:_____

8. Duplicates . . . . . ☐ N/A

Duplicates Analyzed?	(Yes)	No	N/A
RPD Values Acceptable?	(Yes)	No	N/A
Transcription/Calculation Errors?	Yes	No	(N/A)

Comments:_____

A-51

9. Field QC Samples . . . . . ☐ N/A

Field duplicate sample(s) analyzed?	(Yes)	No	N/A
Field duplicate RPD values acceptable?	(Yes)	No	N/A
Field split sample(s) analyzed?	Yes	(No)	N/A
Field split RPD values acceptable?	Yes	No	(N/A)
Performance audit sample(s) analyzed?	Yes	(No)	N/A
Performance audit sample results acceptable?	Yes	No	(N/A)

Comments: NO split or audit

10. Holding Times

Are sample holding times acceptable?	(Yes)	No	N/A

Comments:

11. Results and Detection Limits (Levels D & E) . . . . . ☐ N/A

Results reported for all required sample analyses?	(Yes)	No	N/A
Results supported in raw data?	Yes	No	(N/A)
Results Acceptable?	(Yes)	No	N/A
Transcription/Calculation errors?	Yes	No	(N/A)
MDA's meet required detection limits?	Yes	No	N/A
Transcription/calculation errors?	Yes	No	(N/A)

Comments:

Appendix 6

Additional Documentation Requested by Client

TMA / RICHMOND
SAMPLE DELIVERY GROUP H1193

R012132-09 Method Blank

METHOD BLANK

SDG 7597 Client/Case no Hanford SDG H1193
Contact Melissa C. Mannion Contract TRC-SBB-207925

Lab sample id R012132-09 Client sample id Method Blank
Dept sample id 7597-009 Material/Matrix SOLID
SAF No B01-030

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-0.047	0.14	0.24	400	U	H
Carbon 14	14762-75-5	-1.51	3.0	5.1	50	U	C
Nickel 63	13981-37-8	0.618	0.89	1.9	30	U	NI_L
Total Strontium	SR-RAD	0.125	0.15	0.29	1.0	U	SR
Uranium 233	U-233/234	-0.030	0.060	0.23	1.0	U	U
Uranium 235	15117-96-1	0.036	0.072	0.28	1.0	U	U
Uranium 238	U-238	0.030	0.060	0.23	1.0	U	U
Plutonium 238	13981-16-3	0.017	0.034	0.13	1.0	U	PU
Plutonium 239/240	PU-239/240	0.017	0.034	0.13	1.0	U	PU
Americium 241	14596-10-2	0.025	0.15	0.28	1.0	U	AM
Potassium 40	13966-00-2	U		0.29		U	GAM
Cobalt 60	10198-40-0	U		0.020	0.050	U	GAM
Cesium 137	10045-97-3	U		0.018	0.10	U	GAM
Radium 226	13982-63-3	U		0.067	0.10	U	GAM
Radium 228	15262-20-1	U		0.073	0.20	U	GAM
Europium 152	14683-23-9	U		0.039	0.10	U	GAM
Europium 154	15585-10-1	U		0.046	0.10	U	GAM
Europium 155	14391-16-3	U		0.049	0.10	U	GAM
Thorium 228	14274-82-9	U		0.025		U	GAM
Thorium 232	TH-232	U		0.073		U	GAM
Uranium 235	15117-96-1	U		0.067		U	GAM
Uranium 238	U-238	U		2.3		U	GAM
Americium 241	14596-10-2	U		0.12		U	GAM

105-F Rx Phase IV Upper Fill & Soil

QC-BLANK 37089

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-D8
Version 3.06
Report date 01/11/01

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1193

R012132-08 Lab Control Sample

LAB CONTROL SAMPLE

SDG 7597 Client/Case no Hanford SDG H1193
Contact Melissa C. Mannion Case no TRC-SBB-207925

Lab sample id R012132-08 Client sample id Lab Control Sample
Dept sample id 7597-008 Material/Matrix SOLID
SAF No B01-030

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	24.7	1.3	0.60	400	J	H	26.8	1.1	92	83-117	80-120
Carbon 14	10300	100	14	50		C	11300	450	91	85-115	80-120
Nickel 63	219	4.2	1.8	30		NI_L	232	9.3	94	84-116	80-120
Total Strontium	22.4	0.60	0.16	1.0		SR	22.0	0.88	102	83-117	80-120
Uranium 233	20.4	2.2	1.0	1.0		U	20.0	0.80	102	81-119	80-120
Uranium 235	15.8	1.9	0.26	1.0		U	16.3	0.65	97	80-120	80-120
Uranium 238	21.3	2.2	0.98	1.0		U	21.8	0.87	98	82-118	80-120
Plutonium 238	19.6	2.0	0.19	1.0		PU	19.9	0.80	98	82-118	80-120
Plutonium 239/240	21.9	2.2	0.19	1.0		PU	21.2	0.85	103	82-118	80-120
Americium 241	21.7	2.0	0.17	1.0		AM	23.0	0.92	94	84-116	80-120
Cobalt 60	0.338	0.056	0.039	0.050		GAM	0.373	0.015	91	69-131	80-120
Cesium 137	0.364	0.041	0.024	0.10		GAM	0.335	0.013	109	69-131	80-120

105-F Rx Phase IV Upper Fill & Soil

QC-LCS 37088

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 01/11/01

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1193

R012132-10

B11470

DUPLICATE

SDG 7597
Contact Melissa C. Mannion

DUPLICATE		ORIGINAL
Lab sample id	R012132-10	R012132-01
Dept sample id	7597-010	7597-001
		Received 12/21/00
% solids	94.7	94.7

Client/Case no Hanford SDG H1193
Case no IRC-SBS-207925
Client sample id B11470
Location/Matrix 105F Area SOLID
Collected 12/19/00 08:30
Custody/SAF No 801030-03 801-030

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALIFIERS	RPD %	3σ PROT TOT LIMIT
Tritium	0.469	0.071	0.094	400	J	H	0.425	0.069	0.092	J	10	39
Carbon 14	-0.099	3.1	5.2	50	U	C	-0.517	3.0	5.0	U	-	
Nickel 63	6.94	1.2	2.0	30	J	NI_L	6.23	0.72	1.0	J	11	38
Total Strontium	0.004	0.12	0.21	1.0	U	SR	0.075	0.13	0.25	U	-	
Uranium 233	0.474	0.24	0.18	1.0	J	U	0.382	0.17	0.16	J	22	104
Uranium 235	0.029	0.057	0.22	1.0	U	U	0.026	0.051	0.20	U	-	
Uranium 238	0.403	0.19	0.18	1.0	J	U	0.552	0.22	0.16	J	31	92
Plutonium 238	0.153	0.10	0.20	1.0	U	PU	0	0.035	0.14	U	-	
Plutonium 239/240	0	0.051	0.20	1.0	U	PU	0.071	0.071	0.14	U	-	
Americium 241	-0.017	0.067	0.13	1.0	U	AM	0	0.087	0.17	U	-	
Potassium 40	13.4	0.55	0.22			GAM	13.1	0.64	0.29		2	33
Cobalt 60	0.239	0.041	0.034	0.050		GAM	0.223	0.039	0.035		7	49
Cesium 137	2.35	0.068	0.045	0.10		GAM	2.37	0.076	0.048		1	32
Radium 226	0.494	0.058	0.060	0.10		GAM	0.493	0.073	0.076		0	43
Radium 228	0.557	0.13	0.14	0.20		GAM	0.691	0.15	0.15		21	57
Europium 152	2.28	0.090	0.080	0.10		GAM	2.21	0.10	0.091		3	33
Europium 154	0.222	0.097	0.11	0.10		GAM	0.243	0.090	0.099		9	91
Europium 155	U		0.11	0.10	U	GAM	U		0.12	U	-	
Thorium 228	0.581	0.037	0.042			GAM	0.563	0.042	0.050		3	35
Thorium 232	0.557	0.13	0.14			GAM	0.691	0.15	0.15		21	57
Uranium 235	U		0.13		U	GAM	U		0.16	U	-	
Uranium 238	U		4.3		U	GAM	U		4.6	U	-	
Americium 241	U		0.13		U	GAM	U		0.15	U	-	

105-F Rx Phase IV Upper fill & Soil

DUPW1 37090

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 01/11/01

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1193

R012132-11 B11470

MATRIX SPIKE

SDG 7597		Client/Case no Hanford	SDG H1193
Contact Melissa C. Mannion		Case no TRC-888-207925	
MATRIX SPIKE	ORIGINAL		
Lab sample id R012132-11	Lab sample id R012132-01	Client sample id B11470	
Dept sample id 7597-011	Dept sample id 7597-001	Location/Matrix 105F Area	SOLID
	Received 12/21/00	Collected 12/19/00 08:30	
	% solids 94.7	Custody/SAF No B01030-03	B01-030

ANALYTE	SPIKE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	ORIGINAL pCi/g	2σ ERR (COUNT)	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	49.2	2.5	0.58	400	J	H	49.6	2.0	0.425	0.069	98	82-118	60-140

105-F Rx Phase IV Upper Fill & Soil

QC-MS#1 37091

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-MS
Version 3.06
Report date 01/11/01

MATRIX SPIKES
Page 1
SUMMARY DATA SECTION
Page 12

Date: 19 February 2001
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 105-F Rx Phase IV Upper Fill and Soil Sampling
Subject: Inorganics - Data Package No. H1193-LVI (SDG No. H1193)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H1193-LVI prepared by Lionville Laboratory Incorporated (LVI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B11470	12/19/00	Soil	C	See note 1
B11471	12/19/00	Soil	C	See note 1
B11472	12/19/00	Soil	C	See note 1
B11473	12/19/00	Soil	C	See note 1
B11474	12/19/00	Soil	C	See note 1
B11475	12/19/00	Soil	C	See note 1
B11476	12/19/00	Soil	C	See note 1

1- ICP metals - 6010B (barium and lead); mercury by 7471A; chromium VI by 7196A.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and "Sample and Analysis Plan for 105F and 105DR Phase III Below Grade Structures and Underlying Soils" (DOE/RL-99-35). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Data Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within six (6) months for ICP metals, 30 days for chromium VI and 28 days for mercury.

  All holding times were acceptable.

- **Blanks**

  Preparation (Method) Blanks

  At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

  In the case of negative blank results, if the absolute value exceeds the practical quantitation limit (PQL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the PQL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

  All preparation blank results were acceptable although the PQL was exceeded for lead and chromium VI.

  Field Blanks

  No field blanks were submitted for analysis, therefore, no field blank results were available for review.

- **Accuracy**

  Matrix Spike

  Matrix spike (MS) analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 70% to 130%. Samples with a spike recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

  All matrix spike results were acceptable.

- **Precision**

  Laboratory Duplicate Samples

  Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the PQL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the PQL, the RPD control limit is less than or equal to two times the PQL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

  All laboratory duplicate results were acceptable.

  Field Duplicates

  One pair of field duplicate samples (B11475/B11476) were submitted for analysis. The samples were compared using the same criteria as laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the PQLs to ensure that laboratory detection levels meet the required criteria. All chromium VI results were reported above the PQL. Under the BHI statement of work, no qualification is

required. All other reported laboratory detection levels met the analyte specific PQL.

- **Completeness**

Data package No. H1193-LVI (SDG No. H1193) was submitted for validation and verified for completeness. Completion is based on the percentage of data determined to be valid (i.e, not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

All chromium VI results were reported above the PQL. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-35, *Sample and Analysis Plan for 105F and 105DR Phase III Below Grade Structures and Underlying Soils.*

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1193	REVIEWER: TLI	DATE: 2/19/01	PAGE 1 OF 1
COMMENTS: No qualifiers assigned			

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD																			
Laboratory: LVI																			
Case	SDG: H1193																		
Sample Number		B11470		B11471		B11472		B11473		B11474		B11475		B11476					
Remarks														Duplicate					
Sample Date		12/19/00		12/19/00		12/19/00		12/19/00		12/19/00		12/19/00		12/19/00					
Inorganics	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Barium		69.6		72.0		89.2		72.0		74.1		79.4		74.6					
Mercury	0.08	0.02	U	0.34		0.02	U	0.02	U	0.02	U	0.02	U	0.02	U				
Lead	20	3.8		5.5		5.5		3.8		2.9		5.0		4.2					
Chromium VI	0.1	0.42	U	0.44	U	0.43	U	0.42	U	0.43	U	0.43	U	0.43	U				

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Hazra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 01/16/01

CLIENT: TNUKANFORD B01-030 H1193 HCRA LOT #: 0012L634
WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B11470	Barium, Total	69.6	MG/KG	0.30	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	3.8	MG/KG	2.8	1.0
-002	B11471	Barium, Total	72.0	MG/KG	0.32	1.0
		Mercury, Total	0.04	MG/KG	0.02	1.0
		Lead, Total	5.8	MG/KG	2.6	1.0
-003	B11472	Barium, Total	88.2	MG/KG	0.31	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	5.5	MG/KG	2.5	1.0
-004	B11473	Barium, Total	73.0	MG/KG	0.30	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	3.6	MG/KG	2.8	1.0
-005	B11474	Barium, Total	74.1	MG/KG	0.31	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	2.9	MG/KG	2.5	1.0
-006	B11475	Barium, Total	79.4	MG/KG	0.30	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	5.0	MG/KG	2.5	1.0
-007	B11476	Barium, Total	74.6	MG/KG	0.29	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	4.2	MG/KG	2.4	1.0

2/17/01

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 01/03/01

CLIENT: TNUHANFORD B01-030 H1193 RECRA LOT #: G012L624
WORK ORDER: 10995-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B11470	% Solids	94.7	%	0.01	1.0
		Chromium VI	0.42 U	MG/KG	0.42	1.0
-002	B11471	% Solids	91.4	%	0.01	1.0
		Chromium VI	0.44 U	MG/KG	0.44	1.0
-003	B11472	% Solids	93.6	%	0.01	1.0
		Chromium VI	0.43 U	MG/KG	0.43	1.0
-004	B11473	% Solids	94.0	%	0.01	1.0
		Chromium VI	0.43 U	MG/KG	0.43	1.0
-005	B11474	% Solids	93.6	%	0.01	1.0
		Chromium VI	0.43 U	MG/KG	0.43	1.0
-006	B11475	% Solids	93.9	%	0.01	1.0
		Chromium VI	0.43 U	MG/KG	0.43	1.0
-007	B11476	% Solids	93.6	%	0.01	1.0
		Chromium VI	0.43 U	MG/KG	0.43	1.0

K
2/17/01

06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LVLI
LIONVILLE LABORATORY INC

Analytical Report

Client : TNU-HANFORD B01-030 H1193
RFW# : 0012L634

W.O. # : 10985-001-001-9999-00
Date Received: 12-21-00

INORGANIC CASE NARRATIVE

As of 27 January 2001, Recra LabNet Philadelphia became Lionville Laboratory Inc. Some forms may still reference Recra LabNet Philadelphia.

1. This narrative covers the analyses of 7 soil samples.
2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary.
3. Sample holding times as required by the method and/or contract were met.
4. The cooler temperature was recorded on the chain-of-custody.
5. The method blank for Chromium VI was within method criteria.
6. The Laboratory Control Samples (LCS) for Chromium VI were within the laboratory control limits.
7. The matrix spike recoveries for Chromium VI were within the 75-125% control limits.
8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit.
9. Results for solid samples are reported on a dry weight basis.
10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

02-01-01
Date

J. Michael Taylor
VP, Laboratory General Manager
Lionville Laboratory

slp\1L2-634

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

LVLI LIONVILLE LABORATORY INC

Analytical Report

Client: TNU-HANFORD B01-030
RFW#: 0012L634
SDG/SAF#: H1193/B01-030

W.O.#: 10985-001-001-9999-00
Date Received: 12-21-00

METALS CASE NARRATIVE

1. This narrative covers the analyses of 7 soil samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.

3. All analyses were performed within the required holding times.

4. The cooler temperature has been recorded on the Chain of Custody.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

12. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

13. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

14. As of January 27, 2001, Recra LabNet Philadelphia became Lionville Laboratory Inc. Some forms may still reference Recra LabNet Philadelphia.

02-05-01

J. Michael Taylor
President
Lionville Laboratory, Inc.

Date

jjw/mm12-634

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			B01-030-83	Page 1 of 2
Collector: Doug Bowers	Company Contact: Jason Adler	Telephone No.: 372-2178	Project Coordinator: TRENT, SJ	Price Code: 8L	Data Turnaround: 21 Days
Project Designation: 105-F Rx Phase IV Upper Fill and Soil Sampling	Sampling Location: 105F area		SAF No.: B01-030	Air Quality ☐	
Ice Chest No.: ERC99-042 (1 of 1)	Field Logbook No.: EFL 1133-8	COA: [illegible]	Method of Shipment: Fed EX		
Shipped To: TMA/RECRA	Offsite Property No.: A010187		Bill of Lading/Air Bill No.: 42381953-1426		

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

	Cool 4C	Cool 4C	Cool 4C	None
Preservation	Cool 4C	Cool 4C	Cool 4C	None
Type of Container	aG	aG	aG	aG
No. of Container(s)	1	1	1	~~1~~
Volume	125mL	250mL	250mL	~~500mL~~
SAMPLE ANALYSIS	Chromium Hex - 7196	See item (1) in Special Instructions	PCBs - 8082	See item (2) in Special Instructions

TIE TO: B11304

[redacted]

Sample No.	Matrix *	Sample Date	Sample Time				
B11470	SOIL	12-19-00	0830	X	X	X	
B11471	SOIL	12-19-00	0835	X	X	X	
B11472	SOIL	12-19-00	0840	X	X	X	
B11473	SOIL	12-19-00	0845	X	X	X	
B11474	SOIL	12-19-00	0850	X	X	X	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Doug Bowers / Doug Bowers	12-19-00 1315	Stored in Bel 3C 3728	12-19-00 1315
Removed from Bel 3C 3728	12-20-00 0800	R. Thoren	12-20-00 0800
R. Thoren	12-20-00 0800	FEDEX	
FedEx	12-21-00 1030	[signature]	12-21-00 1030

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) (Barium); ICP Metals - 6010A (Add-on) (Lead); Mercury - 7471 - [CV]
~~(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-90,89 -- Total Sr; Nickel-63; Carbon-14; Tritium - H3~~

RT 12-20-00

Matrix *: S=Soil, SE=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/95)

8100000

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			B01-030-03	Page 2 of 2
Collector: Doug Bowers	Company Contact: Jason Adler	Telephone No.: 372-2178	Project Coordinator: TRENT, SJ	Price Code: 8L	Data Turnaround: 21 Days
Project Designation: 105-F Rx Phase IV Upper Fill and Soil Sampling	Sampling Location: 105F area		SAF No.: B01-030	Air Quality ☐	
Ice Chest No.: ERC99-012 (40H)	Field Logbook No.: EFL 1133-8	COA: R105F4 2F0C	Method of Shipment: Fed EX		
Shipped To: TMA/RECRA 12.19.00	Offsite Property No.: A0 0187		Bill of Lading/Air Bill No.: 423579 53 - 1426		

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

					Cool 4C	Cool 4C	Cool 4C	None
Preservation								
Type of Container					aG	aG	aG	aG
No. of Container(s)					1	1	1	1
Volume					125mL	250mL	250mL	100mL
SAMPLE ANALYSIS					Chromium Hex - 7196	See Item (1) in Special Instructions.	PCBs - 8082	See Item (2) in Special Instructions.
					[redacted]			
Sample No.	**Matrix ***	**Sample Date**	**Sample Time**					
B11475	SOIL	12-19.00	0955		X	X	X	
B11476	SOIL	12-19.00	0955		X	X	X	

Tie TO B11-B11374 RT 12.20.00

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Doug Bowers	12-19-00/1315	Stored in Ref 3C 3728	12.19.00 1315
Removed from Ref 3C 3728	12.20.00 0800	R. Thoren	12.20.00 0800
R. Thoren	12.20.00 0800	FedEx	
FedEx	1030/12.21.00	[illegible]	12.21.00/1030

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) (Barium); ICP Metals - 6010A (Add-on) (Lead); Mercury - 7471 - (CV)
~~(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Isotopic-Plutonium; Isotopic-Uranium; Americium-241; Strontium-89,90 - Total Sr; Nickel-63; Carbon-14; Tritium - H3~~ RT 12.20.00

Matrix *: S=Soil, SE=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100FRX PH IV			DATA PACKAGE: H1193		
VALIDATOR: TLI		LAB: LUI		DATE: 2/17/01	
CASE:			SDG: H1193		
ANALYSES PERFORMED					
☐ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☐	☐
☒ SW-846/ICP	☐ SW-846/GFAA	☒ SW-846/Hg	☐ SW-846 Cyanide	☒ CR VI	☐
SAMPLES/MATRIX B11470 B11471 B11472 B11473 B11474 B11475 B11476					
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

Were initial calibrations performed on all instruments?	Yes	No	N/A
Are initial calibrations acceptable?	Yes	No	N/A
Are ICP interference checks acceptable?	Yes	No	N/A
Were ICV and CCV checks performed on all instruments?	Yes	No	N/A
Are ICV and CCV checks acceptable?	Yes	No	N/A

Comments: _____

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses?	Yes	No	N/A
Are ICB and CCB results acceptable?	Yes	No	N/A
Were preparation blanks analyzed?	Yes	No	N/A
Are preparation blank results acceptable?	Yes	No	N/A
Were field/trip blanks analyzed?	Yes	No	N/A
Are field/trip blank results acceptable?	Yes	No	N/A

Comments: CRDL and PQL Pb and Pb & PQL
NO FB

5. ACCURACY

Were spike samples analyzed?	Yes	No	N/A
Are spike sample recoveries acceptable?	Yes	No	N/A
Were laboratory control samples (LCS) analyzed?	Yes	No	N/A
Are LCS recoveries acceptable?	Yes	No	N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

Were laboratory duplicates analyzed?	(Yes)	No	N/A
Are laboratory duplicate samples RPD values acceptable?	(Yes)	No	N/A
Were ICP serial dilution samples analyzed?	Yes	No	(N/A)
Are ICP serial dilution %D values acceptable?	Yes	No	(N/A)
Are field duplicate RPD values acceptable?	Yes	No	(N/A)
Are field split RPD values acceptable?	Yes	No	(N/A)

Comments: NO FD

7. FURNACE AA QUALITY CONTROL

Were duplicate injections performed as required?	Yes	No	(N/A)
Are duplicate injection %RSD values acceptable?	Yes	No	(N/A)
Were analytical spikes performed as required?	Yes	No	(N/A)
Are analytical spike recoveries acceptable?	Yes	No	(N/A)
Was MSA performed as required?	Yes	No	(N/A)
Are MSA results acceptable?	Yes	No	(N/A)

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses?	(Yes)	No	N/A
Are all results supported in the raw data?	Yes	No	(N/A)
Are results calculated properly?	Yes	No	(N/A)
Do results meet the CRDLs?	Yes	(No)	N/A

Comments: all CRDL ann

Appendix 6

Additional Documentation Requested by Client

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 01/02/01

CLIENT: TNUMANFORD B01-030 M1193 **RECRA LOT #: 0012L634**
WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	00LVI002-MB1	Chromium VI	0.40 U	MG/KG	0.40	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 01/03/01

CLIENT: TNUHANFORD E01-020 H1193 RECRA LOT #: 0012L634
WORK ORDER: 10985-001-001-0000-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	B11470	Soluble Chromium VI	4.8	0.42u	4.2	117.9	1.0
		Insoluble Chromium VI	1400	0.42u	1220	114.4	100
BLANK10	00LVI082-MB1	Soluble Chromium VI	4.1	0.40u	4.0	103.0	1.0
		Insoluble Chromium VI	1230	0.40u	1160	104.9	100

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 01/03/01

CLIENT: TNUHANFORD R01-030 N1193 RECRA LOT #: 0012L634
WORK ORDER: 10988-001-001-0000-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B11470	% Solids	94.7	94.6	0.085	1.0
		Chromium VI	0.42u	0.42u	NC	1.0

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 01/10/01

CLIENT: TNUHANFORD B61-030 H113 RECRA LOT #: 0012L034
WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	99L1872-MB1	Barium, Total	0.30 U	MG/KG	0.30	1.0
		Lead, Total	2.5 U	MG/KG	2.5	1.0
BLANK1	01C0013-MB1	Mercury, Total	0.02 U	MG/KG	0.02	1.0

08

Severn LabNet - Lionville

INORGANICS ACCURACY REPORT 01/10/01

CLIENT: TNUHANFORD B01-035 H1193 RECRA LOT #: 0012L624
WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	311470	Barium, Total	253	49.6	203	90.3	1.0
		Mercury, Total	0.16	0.02u	0.16	101.9	1.0
		Lead, Total	45.9	3.8	50.7	90.9	1.0

00000028

Reeva LabNet - Lionville

INORGANICS PRECISION REPORT 01/10/01

CLIENT: TNHANFORD B01-030 H1193 RECRA LOT #: 0012L634
WORK ORDER: 16988-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B11470	Barium, Total	69.6	71.1	2.1	1.0
		Mercury, Total	0.02u	0.02u	NC	1.0
		Lead, Total	3.8	4.2	10	1.0

Date: 19 February 2001
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 105-F Rx Phase IV Upper Fill and Soil Sampling
Subject: PCB - Data Package No. H1193-LVI (SDG No. H1193)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H1193-LVI prepared by Lionville Laboratory Incorporated (LVI). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B11470	12/19/00	Soil	C	PCBs by 8082
B11471	12/19/00	Soil	C	PCBs by 8082
B11472	12/19/00	Soil	C	PCBs by 8082
B11473	12/19/00	Soil	C	PCBs by 8082
B11474	12/19/00	Soil	C	PCBs by 8082
B11475	12/19/00	Soil	C	PCBs by 8082
B11476	12/19/00	Soil	C	PCBs by 8082

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and "Sample and Analysis Plan for 105F and 105DR Phase III Below Grade Structures and Underlying Soils" (DOE/RL-99-35). Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

  Sample data were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

  If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

  All holding times were acceptable.

- **Method Blank**

  Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than practical quantitaion limit (PQL). If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than PQL, the result is qualified as undetected and elevated to the PQL.

  All method blank target compound results were acceptable.

  Field Blanks

  No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **Accuracy**

  Matrix Spike

  Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike analyses are performed in duplicate and must be

within control limits of 70% to 130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to a matrix spike recovery of 134%, all aroclor results in samples B11470, B11472, B11473, B11474 and B11475 were qualified as estimates and flagged "J".

All other matrix spike results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Non-detected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Non-detected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate recovery results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to a matrix spike/matrix spike duplicate RPD outside QC limits (36%), all aroclor results in samples B11470, B11472, B11473, B11474 and B11475 were were qualified as estimates and flagged "J".

All other matrix spike/matrix spike duplicate precision results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples B11475/B11476) were submitted to LVI for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 105-F/DR PQLs, to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific PQL.

- **Completeness**

Data Package No. H1193-LVI (SDG No. H1193) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to a matrix spike recovery of 134%, all aroclor results in samples B11470, B11472, B11473, B11474 and B11475 were were qualified as estimates and flagged "J". Due to a matrix spike/matrix spike duplicate RPD outside QC limits (36%), all aroclor results in samples B11470, B11472, B11473, B11474 and B11475 were were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-35, *Sample and Analysis Plan for 105F and 105DR Phase III Below Grade Structures and Underlying Soils*.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1193	REVIEWER: TLI	DATE: 2/19/01	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All	UJ	B11470, B11472, B11473, B11474 B11475	MS recovery
All	UJ	B11470, B11472, B11473, B11474 B11475	RPD

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD																					
Laboratory: LVI																					
Case	SDG: H1193																				
Sample Number		B11470		B11471		B11472		B11473		B11474		B11475		B11476							
Remarks														Duplicate							
Sample Date		12/19/00		12/19/00		12/19/00		12/19/00		12/19/00		12/19/00		12/19/00							
PCB	PQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1016	100	35	UJ	35	U	36	UJ	35	UJ	35	UJ	35	UJ	36	U						
Aroclor-1221	100	70	UJ	69	U	71	UJ	71	UJ	71	UJ	71	UJ	71	U						
Aroclor-1232	100	35	UJ	35	U	36	UJ	35	UJ	35	UJ	35	UJ	36	U						
Aroclor-1242	100	35	UJ	35	U	36	UJ	35	UJ	35	UJ	35	UJ	36	U						
Aroclor-1248	100	35	UJ	35	U	36	UJ	35	UJ	35	UJ	35	UJ	36	U						
Aroclor-1254	100	35	UJ	35	U	36	UJ	35	UJ	35	UJ	35	UJ	36	U						
Aroclor-1260	100	35	UJ	35	U	36	UJ	35	UJ	35	UJ	35	UJ	36	U						

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Lionville Laboratory Inc.

PCBs by GC

Report Date: 01/29/01 21:43

RFW Batch Number: 0012L634 Client: THUHANFORD B01-030 H1153 Work Order: 10985001001 Page: 1

	Cust ID:	B11470	B11470	B11470	B11471	B11471	B11471
Sample Information	RFW#:	001	001 MS	001 MSD	002	002 MS	002 MSD
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate: Tetrachloro-m-xylene		88 %	90 %	85 %	98 %	95 %	92 %
Decachlorobiphenyl		80 %	81 %	76 %	96 %	91 %	94 %
		fl	fl	fl	fl	fl	fl
Aroclor-1016		35 U J	35 U	35 U	35 U	34 U	35 U
Aroclor-1221		70 U	70 U	70 U	69 U	69 U	71 U
Aroclor-1232		35 U	35 U	35 U	35 U	34 U	35 U
Aroclor-1242		35 U	35 U	35 U	35 U	34 U	35 U
Aroclor-1248		35 U	35 U	35 U	35 U	34 U	35 U
Aroclor-1254		35 U	134 %	93 %	35 U	105 %	88 %
Aroclor-1260		35 U	35 U	35 U	35 U	34 U	35 U

	Cust ID:	B11472	B11473	B11474	B11475	B11476	PBLKLL
Sample Information	RFW#:	003	004	005	006	007	00LE1699-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate: Tetrachloro-m-xylene		90 %	70 %	82 %	85 %	80 %	82 %
Decachlorobiphenyl		89 %	72 %	83 %	86 %	80 %	89 %
		fl	fl	fl	fl	fl	fl
Aroclor-1016		36 U J	35 U J	35 U J	35 U J	36 U	33 U
Aroclor-1221		71 U	71 U	71 U	71 U	71 U	67 U
Aroclor-1232		36 U	35 U	35 U	35 U	36 U	33 U
Aroclor-1242		36 U	35 U	35 U	35 U	36 U	33 U
Aroclor-1248		36 U	35 U	35 U	35 U	36 U	33 U
Aroclor-1254		36 U	35 U	35 U	35 U	36 U	33 U
Aroclor-1260		36 U	35 U	35 U	35 U	36 U	33 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

2/16/01

Lionville Laboratory Inc.

PCBs by GC

Report Date: 01/29/01 21:43

RFW Batch Number: 0012L634 Client: THEHANFORD B01-030 H1193 Work Order: 10985001001 Page: 2

	Cust ID:	PBLKLL BS	PBLKLN	PBLKLN BS
Sample Information	RFW#:	00LK1699-MB1	01LK0004-MB1	01LK0004-MB1
	Matrix:	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	85 %	85 %	85 %
	Decachlorobiphenyl	86 %	85 %	85 %
Aroclor-1016		33 U	33 U	33 U
Aroclor-1221		67 U	67 U	67 U
Aroclor-1232		33 U	33 U	33 U
Aroclor-1242		33 U	33 U	33 U
Aroclor-1248		33 U	33 U	33 U
Aroclor-1254		94 %	33 U	77 %
Aroclor-1260		33 U	33 U	33 U

0000013

2/7/01

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LVLI LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU HANFORD B01-030
RFW#: 0012L634
SDG/SAF#: H1193/B01-030

W.O.#: 10985-001-001-9999-00
Date Received: 12-21-00

PCB

The set of samples consisted of seven (7) soil samples collected on 12-19-00.

The samples and their associated QC samples were extracted on 12-28-00, 01-02-01 and analyzed according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures on 01-12-01. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082 for Aroclors only.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis have been met.
3. The samples and their associated QC samples received a sulfuric acid.
4. All method blanks were below the reporting limits for all target compounds.
5. All surrogate recoveries were within acceptance criteria.
6. All blank spike recoveries were within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
10. As of January 27, 2001, Recra Labnet Philadelphia became Lionville Laboratory Incorporated. Some forms may still reference Recra Labnet Philadelphia.

11. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

by _____ 02-13-01
J. Michael Taylor Date
President
Lionville Laboratory Incorporated

pdfs:\group\data\pest\12L-634.pdf

1000000

B01-030-03 | Page 2 of 2

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Bechtel Hanford Inc.

Collector: Doug Bowers	Company Contact: Jason Adler — Telephone No. 372-2178	Project Coordinator: TRENT, SJ	Price Code 8L — Data Turnaround 21 Days
Project Designation: 105-F Rx Phase IV Upper Fill and Soil Sampling	Sampling Location: 105F area	SAF No. B01-030	Air Quality ☐
Ice Chest No. ERC 99-042 (40A)	Field Logbook No. EFL 1133-8 — COA R105F4 280C	Method of Shipment: Fed EX	
Shipped To: TMA/RECRA 12-19-00	Offsite Property No. A01 0187	Bill of Lading/Air Bill No. 42357953-1426	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS

	Cool 4C	Cool 4C	Cool 4C	None
Preservation	Cool 4C	Cool 4C	Cool 4C	None
Type of Container	aG	aG	aG	aG / P
No. of Container(s)	1	1	1	1
Volume	125mL	250mL	250mL	1000mL
	Chromium Hex - 7196	See item (1) in Special Instructions.	PCBs - 8082	See item (2) in Special Instructions.

Sample No.	Matrix *	Sample Date	Sample Time	Chromium Hex - 7196	See item (1)	PCBs - 8082	See item (2)					
B11475	SOIL	12-19-00	0855	X	X	X						
B11476	SOIL	12-19-00	0855	X	X	X						

Tie TO B110-B11304 RT 12-20-00

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
Doug Bowers	12-19-00/1315	Doug Bowers / Rel 3C 3728	1315 12-19-00
Removed from Rel 3C 3728	0800 12-20-00	R. Thoreen	0800 12.20.00
R. Thoreen	0800 12.20.00	Fed EX	
Fed Ex	1030/12-21-00	[illegible signature]	12-21-00/1030

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) [Barium]; ICP Metals - 6010A (Add-on) [Lead]; Mercury - 7471 - (CV)
~~(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 - Total Sr; Nickel-63; Carbon-14; Tritium - H3~~ RT 12-20-00

Matrix *: S=Soil, SE=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

Title | Date/Time

LABORATORY SECTION	Received By	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By — Date/Time

BHI-EE-011 (10/99)

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B01-030-03 | Page 1 of 1

Bechtel Hanford Inc.

Collector: Doug Bowers	Company Contact: Jason Adler	Telephone No.: 372-2178	Project Coordinator: TRENT, SJ
Project Designation: 105-F Rx Phase IV Upper Fill and Soil Sampling	Sampling Location: 105F area		SAF No.: B01-030
Ice Chest No.: ERC99-042 (1of1)	Field Logbook No.: EFL 1133-8	COA: NHJF4280C	Method of Shipment: Fed EX
Shipped To: TMA/RECRA	Offsite Property No.: A010187		Bill of Lading/Air Bill No.: 4238 1953-1426

Price Code: 8L | Data Turnaround: 21 Days | Air Quality ☐

POSSIBLE SAMPLE HAZARDS/REMARKS
Special Handling and/or Storage

	Cool 4C	Cool 4C	Cool 4C	None
Preservation				
Type of Container	aG	aG	aG	aG
No. of Container(s)	1	1	1	1
Volume	125mL	250mL	250mL	250mL
SAMPLE ANALYSIS	Chromium Hex - 7196	See item (1) in Special Instructions.	PCBs - 8082	See item (2) in Special Instructions.

[redacted]

TIE TO: B11304

Sample No.	Matrix *	Sample Date	Sample Time				
B11470	SOIL	12-19-00	0830	X	X	X	
B11471	SOIL	12-19-00	0835	X	X	X	
B11472	SOIL	12-19-00	0840	X	X	X	
B11473	SOIL	12-19-00	0845	X	X	X	
B11474	SOIL	12-19-00	0850	Y	X	Y	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Doug Bowers	12.19.00 1315	Stored in Ref 3C 3728	12.19.00 1315
Removed from Ref 3C 3728	12.20.00 0800	B. Rithore	12.20.00 0800
B. Rithore	12.20.00	FEDEX	
FedEx	12.21.00 1030	[signature]	12.21.00 1030

SPECIAL INSTRUCTIONS
(1) ICP Metals - 6010A (TAL) (Barium); ICP Metals - 6010A (Add-on) (Lead); Mercury - 7471 - (CV)
~~(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Isotopic Plutonium, Isotopic Uranium, Americium-241; Strontium-90,89 — Total Sr; Nickel-63; Carbon-14; Tritium-H3~~
RT 12.20.00

Matrix *: S=Soil, SE=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/98)

Appendix 5

Data Validation Supporting Documentation

PESTICIDE/PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 105-F RX PH IV			DATA PACKAGE: H1193		
VALIDATOR: TH		LAB: LUI		DATE: 2/17/01	
CASE:			SDG: H1193		
ANALYSES PERFORMED					
☐ CLP3/90	☐ SW-846 8080	☐ SW-846 8081	☒ 8082	☐	☐
SAMPLES/MATRIX B11470 B11471 B11472 B11473					
B11474 B11475 B11476					
			Soil		

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments: _____

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

3.1 INSTRUMENT PERFORMANCE (METHOD 8080 AND 8081)

Are DDT retention times acceptable . . . . . Yes No (N/A)

Are calibration standard retention times acceptable? . . . . . Yes No (N/A)

Are DDT and endrin breakdowns acceptable? . . . . . Yes No (N/A)

PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are DBC retention times acceptable? . . . . . Yes No N/A

Is the GC/MS tuning/performance check acceptable? . . . . . Yes No N/A

Comments:_____

3.2 CALIBRATIONS (METHOD 8080 AND 8081)

Are EVAL standard calibration factors and %RSD values acceptable? . . . . . Yes No N/A

Are quantitation column calibration factor %RSD values acceptable? . . . . . Yes No N/A

Were the analytical sequence requirements met? . . . . . Yes No N/A

Are continuing calibration %D values acceptable? . . . . . Yes No N/A

Comments:_____

3.3 INSTRUMENT PERFORMANCE AND INITIAL CALIBRATION (3/90 SOW)

Was the initial calibration sequence performed? . . . . . Yes No N/A

Was the resolution acceptable in the resolution check mix? . . Yes No N/A

Is resolution acceptable in the PEM, INDA and INDB? . . . . . Yes No N/A

Are DDT and Endrin breakdowns acceptable? . . . . . Yes No N/A

Are retention times in PEMs and calibration mixes acceptable? . Yes No N/A

Are RPD values in the PEMs acceptable? . . . . . Yes No N/A

Are %RSD values acceptable? . . . . . Yes No N/A

Comments:_____

3.4 CALIBRATION VERIFICATION (3/90 SOW)

Were the analytical sequence requirements met? . . . . . Yes No N/A

Is resolution acceptable in the PEMs? . . . . . Yes No N/A

Are initial calibrations acceptable? . . . . . Yes No N/A

PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are retention times acceptable in the PEMs, INDA and INDB mixes?	Yes	No	N/A
Are RPD values in the PEMs acceptable?	Yes	No	N/A
Are the DDT and endrin breakdowns acceptable?	Yes	No	N/A
Was GPC cleanup performed?	Yes	No	N/A
Is the GPC calibration check acceptable?	Yes	No	N/A
Was Florisil cleanup performed?	Yes	No	N/A
Is the Florisil performance check acceptable?	Yes	No	N/A

Comments:

4. BLANKS

Were laboratory blanks analyzed?	Yes	No	N/A
Are laboratory blank results acceptable?	Yes	No	N/A
Were field/trip blanks analyzed?	Yes	No	N/A
Are field/trip blank results acceptable?	Yes	No	N/A

Comments: NO FB

5. ACCURACY

Were surrogates analyzed?	Yes	No	N/A
Are surrogate recoveries acceptable?	Yes	No	N/A
Were MS/MSD samples analyzed?	Yes	No	N/A
Are MS/MSD results acceptable?	Yes	No	N/A
Were LCS samples analyzed?	Yes	No	N/A
Are LCS results acceptable?	Yes	No	N/A

Comments: MS 13470 J - 70, 72, 73, 74, 75

00000022

A57

PESTICIDE/PCB DATA VALIDATION CHECKLIST

6. PRECISION

Are MS/MSD RPD values acceptable? . . . . . Yes (No) N/A

Are laboratory duplicate results acceptable? . . . . . Yes No (N/A)

Are field duplicate RPD values acceptable? . . . . . (Yes) No N/A

Are field split RPD values acceptable? . . . . . Yes No (N/A)

Comments: 36% RPD # 1 for both

J - 70, 72, 73, 74, 75

7. SYSTEM PERFORMANCE

Is chromatographic performance acceptable? . . . . . Yes No (N/A)

Are positive results resolved acceptably? . . . . . Yes No (N/A)

Comments:

8. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No (N/A)

Is compound quantitation acceptable? . . . . . Yes No (N/A)

Comments:

9. REPORTED RESULTS AND QUANTITATION LIMITS

Are results reported for all requested analyses? . . . . . (Yes) No N/A

Are all results supported in the raw data? . . . . . Yes No (N/A)

Do results meet the CRQLs? . . . . . Yes (No) N/A

Comments: 1221 - all on

Review Comment Record (RCR)

1. Date	2. Review No.
2/20/01	BHI/QA1002
3. Project	**4. Page**
105-F	Page 1 of 2

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No.: H1193	105-F Rx Phase IV Upper Fill and Soil Sampling	Claude Stacey	BHI/QA	H0-16/372-9208

17. Comment Submittal Approval:

Organization Manager (Optional) Date

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact Date

Author/Originator

11. CLOSED

Claude Stacey 02/22/01

Reviewer/Point of Contact Date

Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	PCBs: Page 004, Field Duplicate Samples and Completeness refers to RLN. Rest of data package report refers to the labs new name LVL		Correct Kr	
2	PCBs: Page 004 and 005 states detection limit for Aroclor 1221 was exceeded. Sample and Analysis Plan has the PQL at 0.1 mg/kg (100 ug/kg); therefore, PQL for 1221 wasn't exceeded.		Correct Kr	
3	PCBs: The Data Summary Report has the detection limits for the Aroclors as 50 ug/kg; whereas, the sampling plan has 100 ug/kg.		Correct Kr	
4	Inorganic: Page 010 has detection limits for Hg and Pb as 0.05 and 2 respectively; whereas, the sampling plan has the detection limits at 0.08 and 20 respectively.		correct Kr	
5	Radiochemistry: Page 01, Introduction first sentence has data package number as H1193-E. This should be H1193-ES.		correct Kr	
6	Radiochemistry: page 004, References has the sampling and analysis plan as DOE/RL-96-22. This should be DOE/RL-99-35, Rev., "Sample and Analysis Plan for 105F and 105DR Phase III Below Grade Structures and Underlying Soils."		Correct Kr	

Review Comment Record (RCR)

1. Date	2. Review No.
2/20/01	BHI/QA1002
3. Project	**4. Page**
105-F	Page 2 of 2

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
7	Radiochemistry: page 003 and 004, Detection Limits states the PQLs was exceeded for Eu-155 in samples B11472. This should be the PQL for Eu-154 was exceeded for sample B11472.			
7	Page 010, Co-60 for sample B11471 shows result as 0.04. This should be 0.042.			

Duncan, Jeanette M

From: Weiss, Richard L
Sent: Tuesday, February 20, 2001 11:19 AM
To: Duncan, Jeanette M
Subject: Review of Validation Package for SDG H1193

Jeanette,

SDG H1193

Metals and PCBs packages - No comments

Rad Package - Pg 11: Result reported for B11471 Co-60 should be 0.042 (0.04 is reported). If this is the only issue, don't worry about it in getting the package to Jason.

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2/20/01	BHI/QA1002
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105-F	Page 1 of 2

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No.: H1193	105-F Rx Phase IV Upper Fill and Soil Sampling	Claude Stacey	BHI/QA	H0-16/372-9208

17. Comment Submittal Approval:

Organization Manager (Optional) _____ Date _____

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact _____ Date _____

Author/Originator _____

11. CLOSED

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105-F	Page 2 of 2

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DOE/RL-99-35
Rev. 1

Sampling and Analysis Plan for the 105-F and 105-DR Phase III Below-Grade Structures and Underlying Soils

United States
Department of Energy

- Precision is a measure of the data spread when more than one measurement has been taken for the same sample. Precision can be expressed as the RPD for duplicate measurements. A quantitative definition of the RPD is provided in Section 2.4.3. The level of effort for precision measurements will be a minimum of 1 per 20 samples.

- Completeness is a measure of the amount of valid data obtained from the analytical measurement system and the complete implementation of defined field procedures. The quantitative definition of completeness is given in Section 2.2.2. The target completeness objective for this project is identified in Table 2-2.

Table 2-2. Analytical Performance Requirements. (2 pages)

Data Type	Analytical Method	Analyte	Preliminary Action Level[a]	Detection Limit Requirements		Accuracy Req't (% Recovery)[b]	Precision Req't (%RSD or RSD)
				MDL[a]	PQL[a]		
Performance Requirements for Laboratory Measurements							
Rad	AmAEA	Am-241	TBD	0.1	1	70-130	±30
Rad	GeLi/HPGe	Ba-133	TBD			80-120	±30
Rad	Chemical separation/liquid scintillation	C-14	TBD	5	50	70-130	±30
Rad	GeLi/HPGe	Co-60	100/40[d]	0.05	0.1	80-120	±30
Rad	GeLi/HPGe	Ce-137	TBD	0.05	0.1	80-120	±30
Rad	GeLi/HPGe	Eu-152	TBD	0.1	0.2	80-120	±30
Rad	GeLi/HPGe	Eu-154	TBD	0.1	0.2	80-120	±30
Rad	GeLi/HPGe	Eu-155	TBD	0.05	0.1	80-120	±30
Rad	Chemical separation/liquid scintillation	Ni-63	TBD	5	30	70-130	±30
Rad	PuAEA	Pu-238	TBD	0.1	1	70-130	±30
Rad	PuAEA	Pu-239/240	TBD	0.1	1	70-130	±30
Rad	Rad-Sr	Sr-90	TBD	0.2	1	70-130	±30
Rad	Chemical separation/liquid scintillation	Tc-99	TBD	5	15	70-130	±30
Rad	Distillation liquid separation	Tritium	TBD	5	400	70-130	±30
Rad	UAEA	U-234	TBD	0.1	1	70-130	±30
Rad	UAEA	U-235/236	TBD	0.1	1	70-130	±30
Rad	UAEA	U-238	TBD	0.1	1	70-130	±30

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				MDL[a]	PQL[a]		
Performance Requirements for Field Measurements							
Rad	Portable NaI detector	Gross Cs-137 counts	100/40[d] pCi/g	N/A	60/32 pCi/g[c]	±80-120	±20
Performance Requirements for Laboratory Measurements							
Chem	EPA 7196	Cr6+	2.2 mg/kg	0.03	0.1	70-130	±30
Chem	EPA 6010	Pb	353 mg/kg	5 (0.1)	20 (0.5)	70-130	±30
Chem	EPA 7471	Hg	4 mg/kg	0.02	0.08	70-130	±30
Chem	EPA 8080/8082	PCBs	0.5 mg/kg	0.03	0.1	70-130	±30

[a] Units are in pCi/g or mg/kg unless otherwise specified.
[b] Accuracy for radionuclides are evaluated via associated batch laboratory control sample percent recoveries. The "AEA" and radioactive strontium measurements also require tracer/carrier recoveries to be 20% to 105%.
[c] Minimum detectable activities are achieved with static surveys of 5 and 15 seconds. See Appendix D.
[d] Based on preliminary dose modeling. See Appendix C.
MDL = minimum detection limit
NaI = sodium iodide
PQL = practical quantitation limit
RSD = relative standard deviation
TBD = to be determined

2.1.5 Project Narrative

The following list identifies the project objectives and associated methods (incorporated by reference) to achieve each objective:

- Determining survey and sampling design requirements and description (Section 2.2)
- Determining sample type and sampling location requirements (Section 2.2.2)
- Determining sampling methods (Section 2.2.3)
- Determining sample handling and custody requirements (Section 2.2.4)
- Selecting analytical methods (Section 2.2.5)
- Determining quality control requirements (Section 2.2.6)
- Determining sampling or analytical instrumentation requirements (Section 2.2.5)
- Maintaining ongoing assessments during actual operation (i.e., oversight) (Section 2.3.1)
- Determining data validation by the methods defined (Section 2.4)
- Determining data quality assessment of the sampling design, sampling procedures, and analytical measurement system (Section 2.5).

2.1.6 Special Training Requirements/Certification

Personnel training and certification requirements are described in BHI-HR-02, *ERC Training Procedures.* Field personnel shall have completed the following mandatory training, as described in BHI-HR-02, before starting work:

TRANSMISSION RESULT REPORT (FEB 20 '01 03:50PM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
014	MEMORY TX		12087238944	06/06	OK

ERRORS

1) HANG UP OR LINE FAIL 2) BUSY 3) NO ANSWER 4) NO FACSIMILE CONNECTION

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Rich

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX. (PCi/G) Page__1 of__1

Project: BECHTEL-HANFORD																					
Laboratory: ES																					
Case	SDG: H1193																				
Sample Number		B11470		B11471		B11472		B11473		B11474		B11475		B11476							
Remarks														Duplicate							
Sample Date		12/19/00		12/19/00		12/19/00		12/19/00		12/19/00		12/19/00		12/19/00							
Radiochemistry	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q		
Tritium		0.425		0.545		0.606		0.851		0.401		0.728		0.803							
Carbon-14	50	-0.517	UJ	3.34	UJ	3.85	UJ	2.30	UJ	2.20	UJ	1.85	UJ	2.38	UJ						
Nickel-63	30	8.23		1.50		2.34		10.6		4.10		2.50		3.86							
Strontium (total)	1	0.073	U	0.068	U	0.048	U	0.017	U	0.048	U	0.068	U	-0.012	U						
Uranium-233	1	0.382		0.251		0.363		0.187		0.423		0.240		0.296							
Uranium-235	1	0.028	U	0.030	U	0.059	U	0.085	U	0.032	U	0	U	0.030	U						
Uranium-238	1	0.552		0.251		0.363		0.257		0.449		0.576		0.568							
Plutonium-238	1	0	U	-0.019	U	-0.035	U	0	U	0.018	U	0.017	U	0	U						
Plutonium-239/40	1	0.071	U	0	U	-0.018	U	0.019	U	0.036	U	0.119	U	0.037	U						
Americium-241	1	0	U	0.026	U	0	U	0.116	U	0.099	U	0.072	U	0	U						
Potassium-40		13.1		13.6		13.2		12.4		12.7		13.4		13.3							
Cobalt 60	0.1	0.223		0.04 2		0.064		U	U	0.078		0.063		0.057							
Cesium 137	0.1	2.37		0.584		1.10		0.454		0.818		1.28		1.12							
Radium-226		0.493		0.490		0.537		0.464		0.505		0.464		0.458							
Radium-228		0.691		0.608		0.711		0.6307		0.658		0.741		0.777							
Europium 152	0.2	2.21		0.455	U	0.709		0.534		0.564		0.979		0.835							
Europium 154	0.2	0.243		U	U	U	U	U	U	U	U	U	U	U	U						
Europium 155	0.1	U	U	U	U	U	U	U	U	U	U	U	U	U	U						
Thorium-228		0.563		0.539		0.697		0.578		0.600		0.586		0.595							
Thorium-232		0.691		0.608		0.711		0.630		0.658		0.741		0.777							
Uranium-235 (GEA)		U	U	U	U	U	U	U	U	U	U	U	U	U	U						
Uranium-238 (GEA)		U	U	U	U	U	U	U	U	U	U	U	U	U	U						
Americium-241 (GEA)		U	U	U	U	U	U	U	U	U	U	U	U	U	U						

0.563 OK

0.464 OK

0.630 OK

0.046 OK

0.568 OK

one digit missing

OK - he will fix

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize potential misinterpretation of results. All other qualifiers shown were applied during validation.